REMARKS

The Examiner objected to the amendment filed on June 4, 2003 because, under 35 U.S.C.§132, it allegedly introduced new matter into the disclosure. The Examiner indicated that the change on page 17, lines 2 and 3, of the periods in the equation, which he interrupted as multiplication signs, to subtraction signs constituted new matter. Applicant respectfully disagrees.

On the contrary, the amendment in question merely conformed that equation to the equation in claim 8. Although it is true that the equation in claim 8 originally did not read exactly as the equation on page 17, lines 2 and 3, reads, as amended, the amendment of claim 8 changing "-G" to "-F-G" was necessary to make the equation consistent with the final result namely, "A+D+2C-H".

In response to the Examiner's request for an explanation in paragraph 3 of the Office Action, Applicant explains equation (1), on page 17, lines 2-3, of the specification, with references to proposed amended Fig. 6 enclosed herewith, as follows.

The component layers between the transparent insulating layer 13a and the transparent insulating substrate 6a are: (1) the color filter 16 with thickness A, between transparent insulating layer 13a and overcoat layer 11, outside of the region where column spacer 41 is located, (2) column spacer 41 with height D, (3) overcoat layer 11 with thickness B, between the upper surface of color filter 15 and lower surface of color filter 16 of maximum height, (4) orientation layers 9 with thickness C, (5) passivation layer 8 with thickness E, (6) gate insulating layer 7 with thickness F, and (7) gate electrode 1 with thickness G. The height of the column spacer D is measured from the surface of the overcoat layer 11, which is at the same height as the

upper surface of color filter 15, to the boundary between the overcoat layer 11 and the orientation layer 9, where the column spacer is located.

In the image producing area shown in Fig. 6, the height from the surface of the transparent insulating substrate 13a to the lower surface of the region where the column spacer is located is equal to the total of the thickness A of the color filter 16, the thickness B of the overcoat layer 11 and the height D of the column spacer 41, i.e., (A + B) + D. There is the orientation layer below the column spacer. The height to the lower surface of the upper orientation layer is given as A + B + C + D where C is the thickness of the orientation layer.

In the same region, the height from the surface of the transparent insulating substrate 6a to the lower surface of the lower orientation layer 9 is equal to the total of the thickness G of the gate electrode 1, the thickness F of the gate insulating layer 7, and the thickness E of the passivation layer 8, i.e., G + F +E. Adding the lower orientation layer 9, the height to the upper surface of the lower orientation layer is given as G + F + E + C where C is the thickness of the orientation layer.

The distance between the surface of the transparent insulating substrate 13a and the surface of the transparent insulating substrate 6a is given as (A+B+D+C) + (G+F+E+C).

On the other hand, in the peripheral region in Fig. 6, the height from the surface of the transparent insulating substrate 13a to the surface of the overcoat layer 11 is equal to the total of the thickness H of the black matrix 17 and the thickness B of the overcoat layer 11 insofar as the spacer 22 in the seal does not penetrate into the overcoat layer 11. There is no orientation layer 9 in the peripheral region.

In the same region, the height from the surface of the transparent insulating substrate 6a to the surface of the spacer 22 is equal to the total of the thickness G of the gate electrode 1, the thickness F of the gate insulating layer 7 and the thickness E of the passivation layer 8, i.e., G+F+E. There is no orientation layer therein.

The distance between the surface of the transparent insulating substrate13a and the surface of the transparent insulating substrate 6a in the peripheral region, thus, is equal to the aforementioned heights and the diameter of the spacer 22 in the seal, i.e., (H+B) + (G+F+E) + (Diameter of the spacer).

The following are the optimum conditions for the constant gap created between the transparent insulating substrate 13a and the transparent insulating substrate 6a. The transparent insulating substrate 13a and the transparent insulating substrate 6a are perfectly planar and parallel to each other. For this reason, the distance in the image-forming region is to be equal to the distance in the peripheral region, i.e.,

$$(A+B+D+C) + (G+F+E+C) = (H+B)+(G+F+E) + (\text{diameter of the spacer})$$

From the above equation, the diameter of the spacer is expressed as:

$$\text{Diameter of Spacer} = (A+B+2C+D+E+F+G)-H-B-E-F-G$$

$$= A+D+2C-H$$

Claims 1, 2, and 15 were rejected under 35 U.S.C.§103(a) as being unpatentable over Kishimoto et al., U.S. Patent No. 6,281,960. Claims 10 to 11 were rejected under 35 U.S.C.§103(a) as being unpatentable over Kishimoto in view of Murouchi, U.S. Patent No.

6,067,144. Claims 3-5, 12, 14, and 16-18 were rejected under 35 U.S.C.§103(a) as being unpatentable over Kishimoto and Murouchi and further in view of Mashiko et al., U.S. Patent No. 6,288,766. Claim 6 was rejected under 35 U.S.C.§103(a) as being unpatentable over Kishimoto in view of Ishikawa et al., U.S. Patent No. 6,414,733. Claims 7-9 and 13 was rejected under 35 U.S.C.§103(a) as being unpatentable over Kishimoto and Ishikawa, and further in view of Ogura, U.S. Patent No. 5,739,888.

Claims 1 and 15 provides that at least one of the column spacers is formed between adjacent pixels of the plural pixels. Kishimoto et al., does not disclose, teach, or suggest such a feature. On the contrary, what the Examiner conceives to be the column spacers, elements 108, (Fig.7) (Office Action, page 4, line 3) is located outside of an arrangement of pixels, and the arrangements in the Figs. 1-7 of Kishimoto et al., showing what appear to be column spacers, according to the Examiner, show such column spacers outside of the arrangement of pixels and not between the adjacent pixels.

CLOSING

An earnest effort has been made to be fully responsive to the Examiner's objections. In view of the above amendments and remarks, it is believed that independent claims 1 and 15 are in condition for allowance, as well as those claims dependent therefrom. Passage of this case to allowance is earnestly solicited.

However, if for any reason the Examiner should consider this application not to be in condition for allowance, he is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper, not fully covered by an enclosed check, may be charged on Deposit Account 50-1290.

Respectfully submitted,

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Enclosure: Amended Fig. 6

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